

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-20 are pending, with claims 1, 3, 8, 12, 17 and 19 amended by the present amendment. Claims 1, 8 and 17 are independent.

In the Official Action, the restriction was withdrawn; claims 1, 5-8 and 14-18 were rejected under 35 U.S.C. § 103(a) in view of Hallberg (U.S. Patent No. 6,658,199), Guttman (U.S. Patent No. 7,031,259) and Greg ("An MPEG-2 Digital Decoder Design"); claims 9-10 were rejected under § 103(a) in view of Hallberg, Guttman, Greg and Ando (U.S. Patent No. 6,453, 116); and claims 2-4, 11-13 and 19-20 were indicated as containing allowable subject matter.

Applicant acknowledges with appreciation the indication of allowable subject matter.

Claims 1, 8 and 17 are amended to more clearly describe and distinctly claim Applicant's invention. Claims 3, 12 and 19 are amended to maintain antecedent support. Support for this amendment is found in Applicant's originally filed specification. No new matter is added.

Briefly recapitulating, amended claim 17 is directed to

A playback method in a digital video record/playback apparatus, comprising:

a step (a) of storing transport packets of a selected program, picture information, and a PCR (program clock reference) of the selected program;

a step (b) of performing a STC (system time clock) count initialization using a value of the stored PCR and synchronizing the STC count with a STC according to a direction of a trick play mode;

a step (c) of adjusting a DTS (decoding timestamp) of a picture to be decoded according to the direction and multiple-times speed of the trick play mode; and

a step (d) of decoding to output picture data of the selected program by controlling a decoding time point by comparing a difference between the adjusted DTS and the STC count to a reference value and by referring to the picture information according to the trick play mode.

wherein the step (d) includes calculating a difference between the DTS and a DTS value of a first picture at a beginning of a predetermined trick play and adjusting the DTS according to the calculated difference and the predetermined playback mode. (Emphasis added.)

Hallberg describes a method and system for creating a trick play video display from a group of MPEG video transport frames. Referring to FIG. 1B, at the receiver 12, a broadcast signal is demodulated in a demodulator 48. The resulting transport data stream 50 is depacketized and demultiplexed in a transport depacketization and demultiplexing subsystem 52. The transport stream data for the individual elementary data streams are stored temporarily in an elementary buffer 54. The data streams for the individual program elements are then decoded and decompressed as appropriate in application decoders, including a video decoder 56 and an audio decoder 58. The decoded data is sent to a presentation subsystem 60 for presentation to the viewer at a time designated by a presentation time stamp associated with each video frame.

FIG. 6 of Hallberg describes that, if the length of the trick play GOP is acceptable, a new program clock reference (PCR) is determined for and associated with each frame of the trick play GOP 94. First, the space available in the elementary buffer (EB) 54 is determined 200. The current PCR value is compared with the decoding time stamp (DTS) of each frame having a previously assigned DTS. The DTS specifies the time at which the frame is to be removed from the elementary buffer to begin decoding. If the DTS value of a frame is greater than the current PCR value, then the frame remains in the elementary buffer and the frame's size is subtracted from the total capacity of the buffer to determine the available space in the buffer. After

determining the available space in the elementary buffer, the size of the current frame is compared to the available space to determine whether the current frame will fit in the buffer 202. If there is insufficient space in the buffer, the current PCR is set to the earliest DTS value of a frame currently in the buffer 204. The effect is to delay storage for one frame period, permitting the oldest frame in the buffer 54 to be removed and the space it occupied to be added to the available storage space. The available space in the elementary buffer 54 is again determined and compared to the size of the next frame until there is sufficient space in the buffer 54 for the frame. When there is sufficient excess space in the buffer 54 to permit storage of the frame, the frame's PCR is set to the current PCR 206. The current PCR value is then adjusted by advancing the PCR by the time required to transmit (TX) the frame to the receiver 208. The time for transmitting a frame is determined by the frame's size and the bandwidth of the communication channel 64.

Following adjustment of the PCR by Hallberg, a new DTS is calculated for the current frame 210. Initially, the new DTS is set to the greater of two values. The first value depends upon whether the previous frame was or was not a B-frame. If the previous frame was not a B-frame, the initial DTS is set to the previous frame's DTS value plus the time required to decode the current frame which is assumed to be one frame period. This allows the previous frame to be fully decoded before decoding of the current frame begins. If the previous frame was a B-frame, the initial DTS is the previous frame's PTS value. This permits the B-frame to be displayed before the current frame begins decoding. Failing to wait for the B-frame to be displayed could cause removal of the B-frame from the decoder's buffer before it can be placed in the buffer in the presentation subsystem 60. The second potential initial value of the new DTS is the start time

of the frame period nearest to, but not earlier than, the current PCR. Setting the DTS to this value forces the current frame to begin decoding only on a frame period boundary and only after the frame is completely received in the elementary buffer 54. If the current frame is a reference frame (I- or P-frame), the current DTS is further set to the maximum of the previously calculated initial DTS or the PTS of the oldest of the last two decoded reference frames. Adjusting the DTS in this manner assures that only two decoded reference frames are allowed to be in storage at any time in the elementary buffer 54, avoiding buffer overflow.

After Hallberg determines a new DTS for the current frame, a determination is made whether the current frame will be displayed 212. A frame may be decoded to facilitate decoding a display frame, but may not itself be displayed. Due to the forward predictive nature of MPEG-2 only the last decoded occurrence of a frame is actually displayed. If a frame will not be displayed, then its PTS 214 and temporal reference 216 values are set well beyond the PTS and temporal reference values of the trick play GOP's last frame. When the subsequent GOP is decoded, the initial temporal reference value is reset to zero and frames from the earlier GOP will not be displayed.

If the frame of Hallberg will be displayed, a new presentation time stamp (PTS) is calculated for the frame 218. The PTS is the moment of the system time at which the frame will be presented. The PTS for the initial, displayed frame of the trick play GOP is set equal to the frame's DTS plus the time required to decode the frame. The time required to decode a frame is preferably assumed to be one frame period. If the current frame is not the first display frame of the trick play GOP, then its PTS will be set to the greater of either the frame's DTS value plus the frame decoding time or a target PTS value. The target PTS attempts to position the frame's

presentation time relative to other frames of the trick play GOP in a position approximately proportional to that frame's presentation time in the frames of the original transport GOP. The purpose of the target GOP is to temporally smooth the trick play video display. The target GOP is determined by an equation that takes into account

- `first_frame_PTS` = the PTS value of the first frame to be displayed in the trick play display;
- `frame_period` = the amount of time a single frame is displayed;
- `target_GOP_frames` = the desired number of frames to be included in the trick play GOP;
- `first_temporal_reference` = the temporal reference value from the original transport stream GOP of the first frame displayed in the trick play video display;
- `current_temporal_reference` = the temporal reference from the transport stream GOP of the current frame of the trick play GOP; and
- `last_temporal_reference` = the temporal reference from the transport stream GOP of the last frame of the trick play GOP.

As the result of this adjustment of the PTS by Hallberg, the elapsed times between a) the presentation of the first frame of the original GOP that is displayed in both the original and trick play GOPs and b) a display frame of interest is approximately proportional to the relative lengths of the two GOPs.

However, as acknowledged by the Official Action, Hallberg does not disclose or suggest Applicant's claimed step of "step (d) of decoding to output picture data of the selected program by controlling a decoding time point by comparing a difference between the adjusted DTS and the STC count to a reference value and by referring to the picture information according to the trick play mode." To cure this deficiency, the Official Action applies Greg.

Greg describes methods for managing streams for video and audio decoding. Time stamp method 2 of Greg includes reading DTS information from a video buffer and calculating a DTS-

PCR (program clock reference) difference in order to further calculate a delay required before decoding starts.

However, contrary to the Official Action, Greg does not disclose or suggest "comparing a difference between the adjusted DTS and the STC count to a reference value and by referring to the picture information according to the trick play mode." That is, while Greg describes calculating a DTS-PCR difference in order to further calculate a delay required before decoding starts, Greg does not describe specifically how the DTS-PCR difference is used to calculate the delay. Greg clearly does not describe comparing the DTS-PCR difference to a reference value and then referring to the picture information according to the trick play mode. Thus, for a first reason, claim 17 patentably defines over Hallberg and Greg.

Furthermore, the Official Action does not describe how the process of Hallberg would be modified to use the DTS-PCR difference of Greg. In effect, the outstanding rejection does little more than attempt to show that parts of Hallberg and Greg were individually known and then suggest that such a showing is all that is necessary to establish a valid case of *prima face* obviousness. The PTO reviewing court recently reviewed such a rationale and dismissed it in *In re Rouffet*, 149 F. 3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) as follows:

As this court has stated, "virtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983); see also *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 USPQ 8, 12 (Fed. Cir. 1983) ("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81

F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. [emphasis added.]

There has been no such showing of those required reasons made in the rejection. Thus, for a second reason, claim 17 patentably defines over Hallberg and Greg.

Furthermore, Greg does not disclose or suggest “calculating a difference between the DTS and a DTS value of a first picture at a beginning of a predetermined trick play and adjusting the DTS according to the calculated difference and the predetermined playback mode.” Thus, for a third reason, claim 17 patentably defines over Hallberg and Greg.

For similar reasons to those presented above relative to claim 17, independent claims 1 and 8 also patentably define over Hallberg and Greg.

Applicant has considered the remaining applied references and submits the remaining applied references do not cure the deficiencies of Hallberg and Greg. As none of the cited art, individually or in combination, discloses or suggests at least the above-noted features of independent claims 1, 8 and 17, Applicant submits the inventions defined by claims 1, 18 and 17, and all claims depending therefrom, are not rendered obvious by the asserted references for at least the reasons stated above.¹

¹ MPEP § 2142 “...the prior art reference (or references when combined) must teach or suggest all the claim limitations.

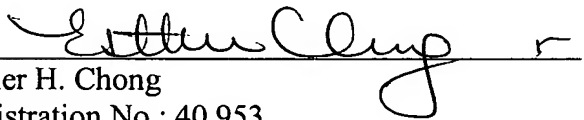
CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael E. Monaco, Reg. No. 52,041, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§ 1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,

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